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CLAIM + DETAILED DESCRIPTION

[Claim(s)]
[Claim 1] The cement additive characterized by containing the anhydrous salt and/or monohydrate of ferrous sulfate.
[Claim 2] The cement additive according to claim 1 whose mean particle diameter of the anhydrous salt of ferrous sulfate and/or monohydrate is 1-600 micrometers.

[Detailed Description of the Invention]
[0001]
[Field of the Invention] Even if cement containing

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hexavalent chromium is used for this invention, it relates to the cement additive with which the reduction capability of the hexavalent chromium which dissolves in bleeding underwater does not decline.

[0002]

[Description of the Prior Art] In the cement industry, using wastes, such as raw sludge and refuse incineration ash, as a raw material for cement clinker is advanced in recent years. In wastes, such as the aforementioned raw sludge and refuse incineration ash, chromium may be contained and a possibility of containing a small amount of hexavalent chromium is pointed out into the cement which used as the raw material waste containing such chromium.

[0003] When mortar and concrete are manufactured using cement containing hexavalent chromium, hexavalent chromium dissolves in bleeding underwater and it may be emitted to natural environment with bleeding water. On the other hand, the technology which returns underwater hexavalent chromium to poorly soluble trivalent chromium is conventionally known with ferrous sulfate.

[0004]

[Problem(s) to be Solved by the Invention] In mortar or concrete, bleeding continues for several hours and hexavalent chromium in cement dissolves in bleeding underwater gradually with time progress after irrigation. Therefore, even when ferrous sulfate is blended at the time of kneading of mortar or concrete, the reduction effect of bleeding underwater hexavalent chromium may be low. Since it was such, even if it used cement containing hexavalent chromium, development of the cement additive with which the reduction capability of the hexavalent chromium which dissolves in bleeding underwater does not decline was desired.

[0005]

[Means for Solving the Problem] The result of having inquired wholeheartedly this invention persons developing the cement additive with which the reduction capability of the hexavalent chromium which dissolves in bleeding underwater does not decline in view of this actual condition, As opposed to the hexavalent chromium which the ferrous sulfate used conventionally is mainly the thing of seven monohydrates, and dissolves in bleeding underwater gradually in order for this to dissolve in water quickly and to

discover the reduction effect It became clear that the reduction effect fell, it found out that the reduction effect of hexavalent chromium was [in which no such fault is] high if it is the anhydrous salt and/or monohydrate of ferrous sulfate, and this invention was completed.

[0006] That is, this invention is a cement additive (Claim 1) characterized by containing the anhydrous salt and/or monohydrate of ferrous sulfate. As for the mean particle diameter of the anhydrous salt of said ferrous sulfate, and/or monohydrate, 1-600 micrometers is desirable (Claim 2).

[0007]

[Embodiment of the Invention] This invention is explained in detail hereafter. The cement additive of this invention contains the anhydrous salt and/or monohydrate of ferrous sulfate. In order that a dissolution rate may dissolve the anhydrous salt and/or monohydrate of ferrous sulfate in water gradually late, the reduction effect is maintained also to the hexavalent chromium which dissolves in bleeding underwater gradually. Although four monohydrates, five monohydrates, and no less than seven monohydrates exist in ferrous sulfate in addition to anhydrous salt or monohydrate, since the reduction effect falls to the hexavalent chromium which dissolves in bleeding underwater gradually, these are not desirable, in order to dissolve in water quickly and to discover the reduction effect.

[0008] In this invention, it is desirable to use the monohydrate of ferrous sulfate from the ease of carrying out of acquisition, a point of cost, etc. A reagent, an industrial commodity, etc. can be used for the monohydrate of this ferrous sulfate.

[0009] In this invention, as for the mean particle diameter of the anhydrous salt of ferrous sulfate, and/or monohydrate, 1-600 micrometers is desirable, and its 5-500 micrometers are more desirable. Since the reduction effect over the hexavalent chromium which mean particle diameter dissolves in bleeding underwater since a dissolution rate becomes quick in the fine thing below 1 micrometer falls, it is not desirable. Since the dissolution rate is too slow when mean particle diameter exceeds 600 micrometers, and the reduction effect over the hexavalent chromium which dissolves in bleeding underwater falls, it is not desirable.

[0010] The mixture with which the cement additive of this invention mixed chemical admixtures, such as blast furnace

slag, fly ash, silica fume, metakaolin, limestone powder, and silica powder, with the cement which contains hexavalent chromium as target cement, or cement containing hexavalent chromium is mentioned. Cement containing hexavalent chromium is cement manufactured using the raw material (waste is included) containing chromium.

[0011] In this invention, more than the 0.01 weight section of the amount of addition of a cement additive is desirable in the quantity of the anhydrous salt of ferrous sulfate, and/or monohydrate to the mixture 100 weight section of cement or this cement containing hexavalent chromium, and a chemical admixture, and its 0.05 - 3.0 weight section is more desirable. Since the reduction effect over the hexavalent chromium which the quantity of the anhydrous salt of ferrous sulfate and/or monohydrate dissolves in bleeding underwater under in the 0.1 weight section falls, it is not desirable. It is not desirable that the coagulation of mortar and concrete is delayed in cost's becoming high, if the 3.0 weight sections are exceeded on the other hand etc., in order that a bad influence may come out in the physical properties of mortar and concrete.

[0012] In this invention, the addition time in particular of a cement additive is not limited. For example, the cement additive of this invention is added at the time of manufacture of 1 cement, i.e., grinding of a clinker. You may grind and mix, the cement additive of this invention may be added into the mixture of cement before kneading with 2 water or cement, and a chemical admixture, and you may mix into it, and at the time of 3 kneading, it may supply to a mixer together with other material, and you may knead.

[0013]

[Example] A work example explains this invention hereafter.

1) 10 ppm (Cr6+ conversion) addition of the potassium chromate (reagent) was carried out, and test production of the cement containing hexavalent chromium was carried out to test production ordinary portland cement (made by Taiheiyo Cement Corp.) of cement containing hexavalent chromium.

2) Use the preparation aforementioned test production cement of concrete. The amount of unit cement of 297kg/m3, water / cement ratio 60 weight %, an AE water-reducing agent (product made from NMB "Pozo Rith

No.70") / cement ratio 0.25 weight %, Concrete was prepared on conditions with a rate [48% of] of a fine aggregate, and an amount [of AE assistants (product made from NMB "micro air 303A")] of 2.5g/m3. In addition, ferrous sulfate and monohydrate of the quantity shown in Table 1 in the case of kneading (Fuji titanium company make, mean particle diameter; 75 micrometers), or ferrous sulfate and 7 monohydrate (made by a Fuji titanium company) was added to concrete. Moreover, the crushed sand from Ome was used as a fine aggregate, and the crushed stone from Ome was used as coarse aggregate.
3) applying the bleeding water of measurement aforementioned each concrete of the bleeding underwater amount of Cr6+ to "JIS A 1123 (bleeding test method of concrete)" correspondingly -- up to after-kneading 60 minutes At intervals of ** 10 minutes, after it, it extracted at intervals of 30 minutes till 3 hours, the bleeding underwater collected Cr contents were measured by ICP, and it was considered as the amount of Cr6+. A result is shown in Table 1.

[0014]

[Table 1]

添加剤	添加量*	Cr^{6+}量 (ppm)
硫酸第一鉄・一水塩	0．1	N．D．
硫酸第一鉄・一水塩	0．3	N．D．
硫酸第一鉄・一水塩	0．5	N．D．
硫酸第一鉄・七水塩	0．1	0．94
硫酸第一鉄・七水塩	0．3	0．58
硫酸第一鉄・七水塩	0．5	0．38

*セメント100重量部に対する重量部

[0015] In the work examples 1-3 which blended ferrous sulfate and monohydrate which is the cement additive specified by this invention, Cr6+ was undetectable to bleeding underwater.

[0016]
[Effect of the Invention] As explained above, even if it uses cement containing hexavalent chromium, in the cement additive of this invention, the reduction capability of the hexavalent chromium which dissolves in bleeding underwater does not decline.

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